

(43) International Publication Date  
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number  
WO 2005/078932 A1(51) International Patent Classification<sup>7</sup>: H03K 19/0185, G06F 13/40, G05F 1/56

J. [NL/SG]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). TJIA, Jerome [SG/SG]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(21) International Application Number:

PCT/IB2004/052934

(74) Agents: ELEVLED, Koop, J. et al.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(22) International Filing Date:

29 December 2004 (29.12.2004)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language:

English

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

(26) Publication Language:

English

(30) Priority Data:

04100111.6 15 January 2004 (15.01.2004) EP

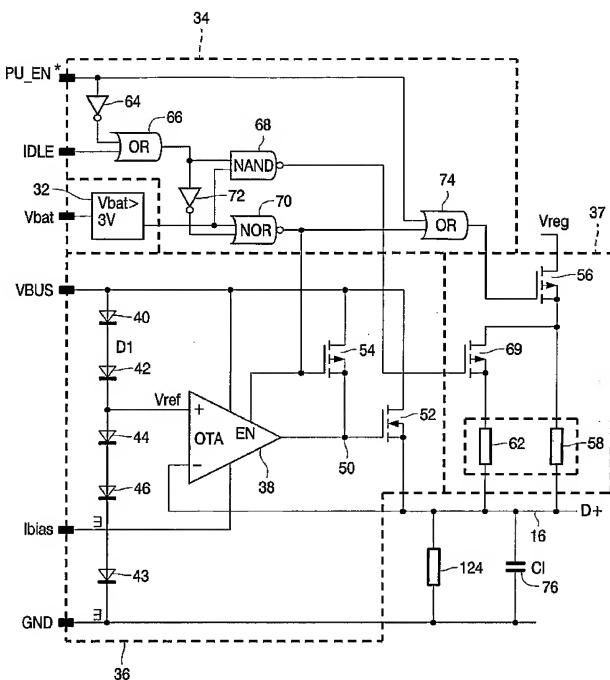
(71) Applicant (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): STOPEL, Rick, F.,

[Continued on next page]

(54) Title: PULL-UP CIRCUIT



(57) **Abstract:** A pull-up circuit comprises an operational amplifier which forms part of a feedback circuit, acting to bring a pull-up circuit output equal to a reference voltage input. The pull-up circuit may form part of a USB transceiver for incorporation in a USB Device. When the supply voltage of the USB Device is sufficiently high, it is used to provide the required pull-up voltage, with the feedback circuit including the operational amplifier being enabled only when the supply voltage of the USB Device is not high enough to provide the required pull-up voltage. In that case, the USB bus voltage is used to generate the reference voltage which is used as an input to the feedback circuit.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*

**Published:**

- *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*